

Removal of Central Lake Belt Storage. DRAFT (9/11/98)

Description of Simulation

Simulation (run) is based on ALTD13R with of Central Lake Belt Storage (Component S) removed. The scenario run is labeled NOCLKB in the attached graphics. In ALTD13R the Central Lake Belt Storage covers 5,200 acres with a maximum storage depth of 36 feet. The storage area is filled with excess water from WCA-3A and WCA-3B and releases water to NESRS via S-356 A and B if stage at G1502 location falls below desired levels.

Assumptions

- Central Lake Belt Storage (CLBSA) and perimeter seepage barrier are completely removed (Figure 1).
- WCA-3A and WCA-3B excess water that is put into CLBSA under ALTD13R assumptions would be sent, via the borrow canals in ALTD13R and the S-356's, to ENP with no diversion.

Summary of Results

The removal of the Central Lake Belt storage results in the following:

- Significant increase in structural outflow from WCA-3A (WC3TLB in Table 1) and in seepage from WCA-3 to LEC, as shown in Table 1. The increase in outflows lowered stages in WCA-3B and eastern WCA-3A during high and low water conditions, as evident in Table 3. The increase in structural outflow from WCA-3A toward ENP is mainly a result of available storage in CLBSA no longer being a limiting factor. As a consequence approximately 10% less volume (508 kac-ft./year to 450 kac-ft./year) of overland flow across Tamiami Trail to NESRS occurred.
- A marked change in the seasonal distribution of flows through S356 A and B, even though the average annual flow is similar as indicated in Table 1. In ALTD13R, the seasonal split is 37% in wet season, 63% in dry season; with Central Lake Belt removed, the seasonal split is 58% in wet season, 42% in dry season. The reason for this is in ALTD13R, 90% of the outflow from CLBSA occurs in the dry season when NESRS needs the water. This seasonal redistribution of S356 flows to NESRS from L31N has a direct impact on the seasonal distribution of overland flow westward into NESRS, as shown in Figure 2.
- The above discussion translates to a significant reduction in stages in NESRS. Figure 3 shows the maximum decrease is about 0.5 feet which occurs during the spring months (April and May). The effect on duration of inundation and low water conditions in the Shark River Slough region is shown in Table 2. This shows the importance of timing in routing excess water to ENP and the necessity of additional storage in achieving the desired result in ALTD13R.

- Increased surface water flows to Biscayne Bay as seen in Figure 4. The greatest increase (56kac-ft/year) is to the central part of the Bay as a result of increased seepage from WCA-3B and groundwater flow eastward due to the removal of the Central Lake Belt reservoir and its seepage barrier.
- Increase in water depths in Pensucco wetlands during the wettest times (more like NSM) and lower during the drier times as seen in Figure 5. This is caused by the shift in timing of available water for NESRS as illustrated by the redistribution of S356 flows.
- Removal of Central Lake Belt storage had no effect on frequency of water restrictions in LEC and minimal effect on Lake Okeechobee.

Table 1. Average Annual Flow Comparisons at Selected Locations (units are in thousand acre-feet)

Location or Model Flow Variable Name*	ALTD13R	NOCLKB	Change
WC3TLB	37	103	+66
S32	49	170	+121
Seepage from WCA-3A LEC	270	314	+44
LBTPK	93	0	-93
S31ENV	46	45	-1
NWSRS	429	412	-17
NESRS	508	450	-58
S-356's	264	268	+4
Central Biscayne Bay	200	256	+56

*Identified in Figure 1.

Table 2. Inundation and Low Water Summary for impacted Indicator Regions in Shark River Slough

Indicator Region Number	Name	Depth (ft.) Criterion	#Events/Avg. Duration(wks per event)/ Avg. Annual Duration (% of yr)	
			ALTD13R	NOCLKB
8	Rockland Marl Marsh	Inundation <-1.5	36/26/59 22/10/14	39/24/58 27/10/17
11	NE Shark River Slough	Inundation <-1.0	7/226/98 3/2/0	15/102/95 4/3/1
12	New Shark River Slough	Inundation <-1.0	27/52/87 13/5/4	32/43/85 17/5/5
10	Mid Shark River Slough	Inundation <-1.0	4/398/99 2/2/0	13/119/96 4/3/1

Table 3. High and Low Water Summary for impacted Indicator Regions in WCA-3A and WCA-3B

Indicator Region Number	Name	Depth (ft) Criterion	#Events/Avg. Duration (wks per event)/ Avg. Annual Duration (% per yr)	
			ALTD13R	NOCLKB
15	West WCA-3B	>2.5 Inundation <-1.0	5/10/3 4/398/99 2/3/0	5/9/3 11/141/96 3/4/1
16	East WCA-3B	>2.5 Inundation <-1.0	13/7/5 6/262/98 4/3/1	13/6/05 18/84/94 7/4/2
18	North Central WCA-3A	>2.5 <-1.0	3/7/1 1/6/0	3/5/1 2/4/0

Fig. 1 Sensitivity to Removal of Central Lake Belt Storage from Alt D13R

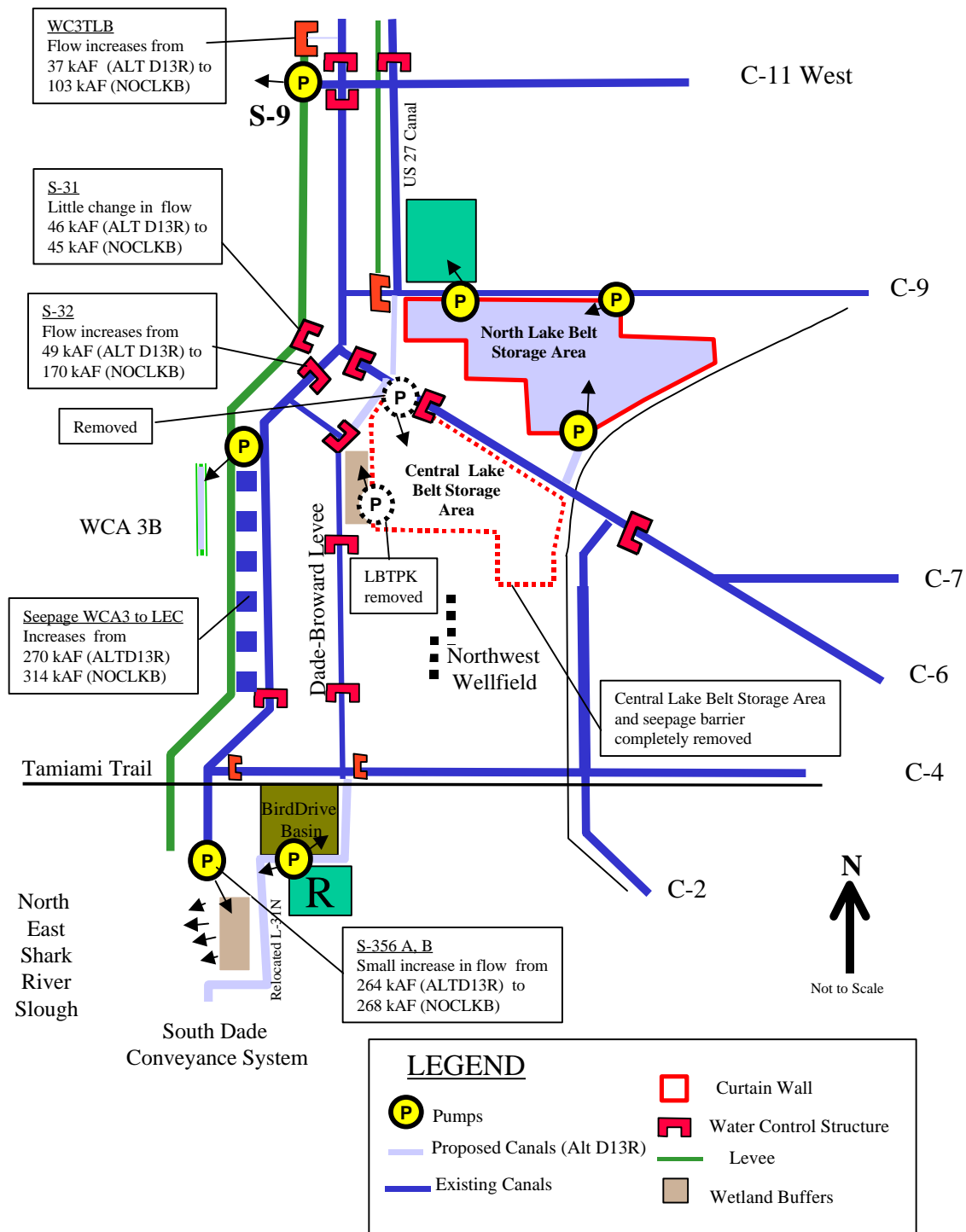
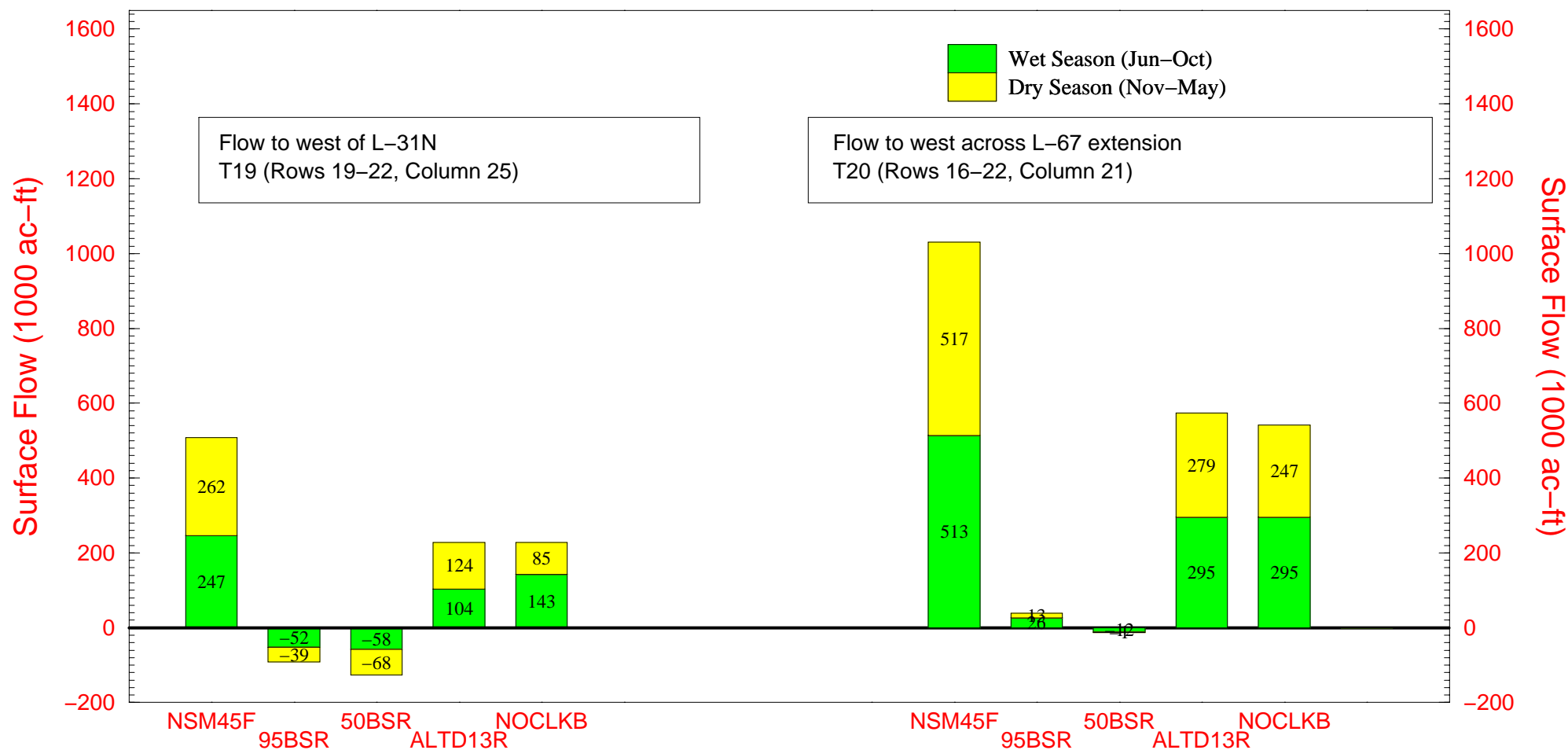


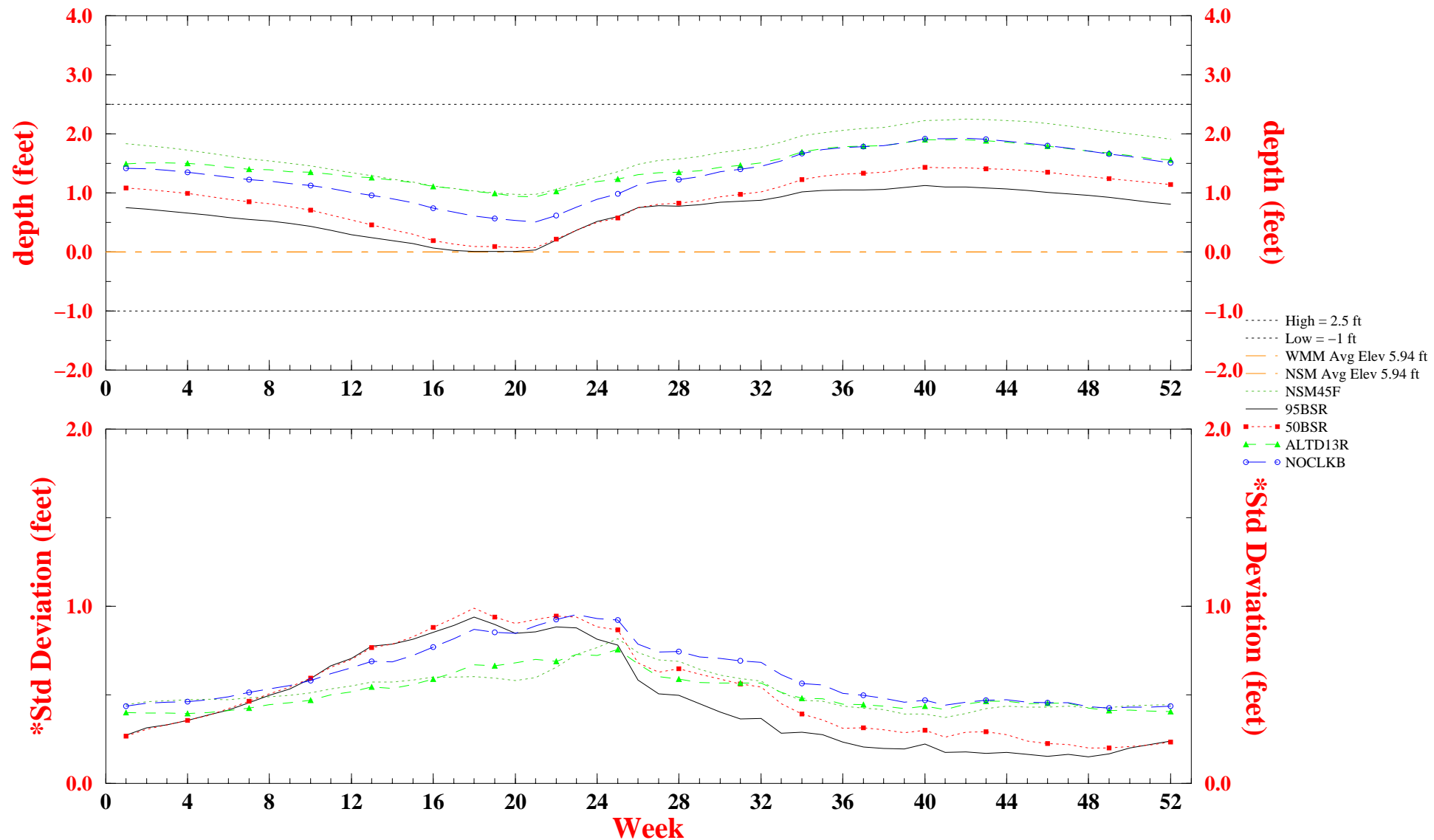
Fig. 2 Average Annual Overland Flow westward within the ENP
for the 31 year simulation period



Note: NSM flows are NOT targets and are shown for comparative purposes only.
Negative values indicate flows from west to east.

Fig. 3 Temporal Variation in Mean Weekly Stage for NE Shark River Slough

Indicator Region 11 (R19C22–23 R20C22–26 R21C22–26)



WEEK 1 STARTS JAN 1

Depth and elev are weekly means for the indicator region for a 31 year simulation

High/Low = 0 indicates criteria undefined for region

* Standard Deviations are calculated among-year values;

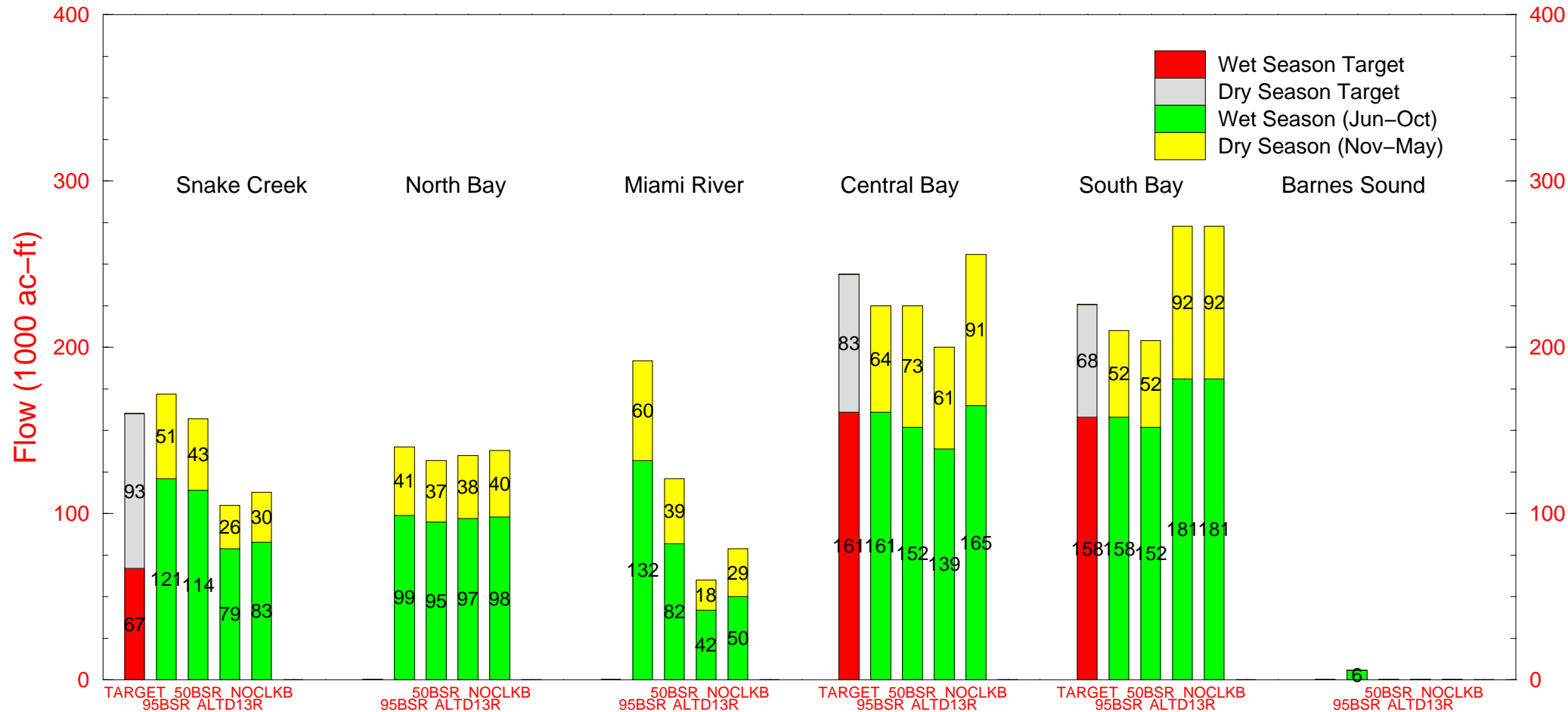
* they illustrate interannual variation in mean weekly depth over the 31 year simulation period.

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Fig. 4 Simulated Mean Annual Surface Flows Discharged into Biscayne Bay for the 1965 – 1995 simulation period

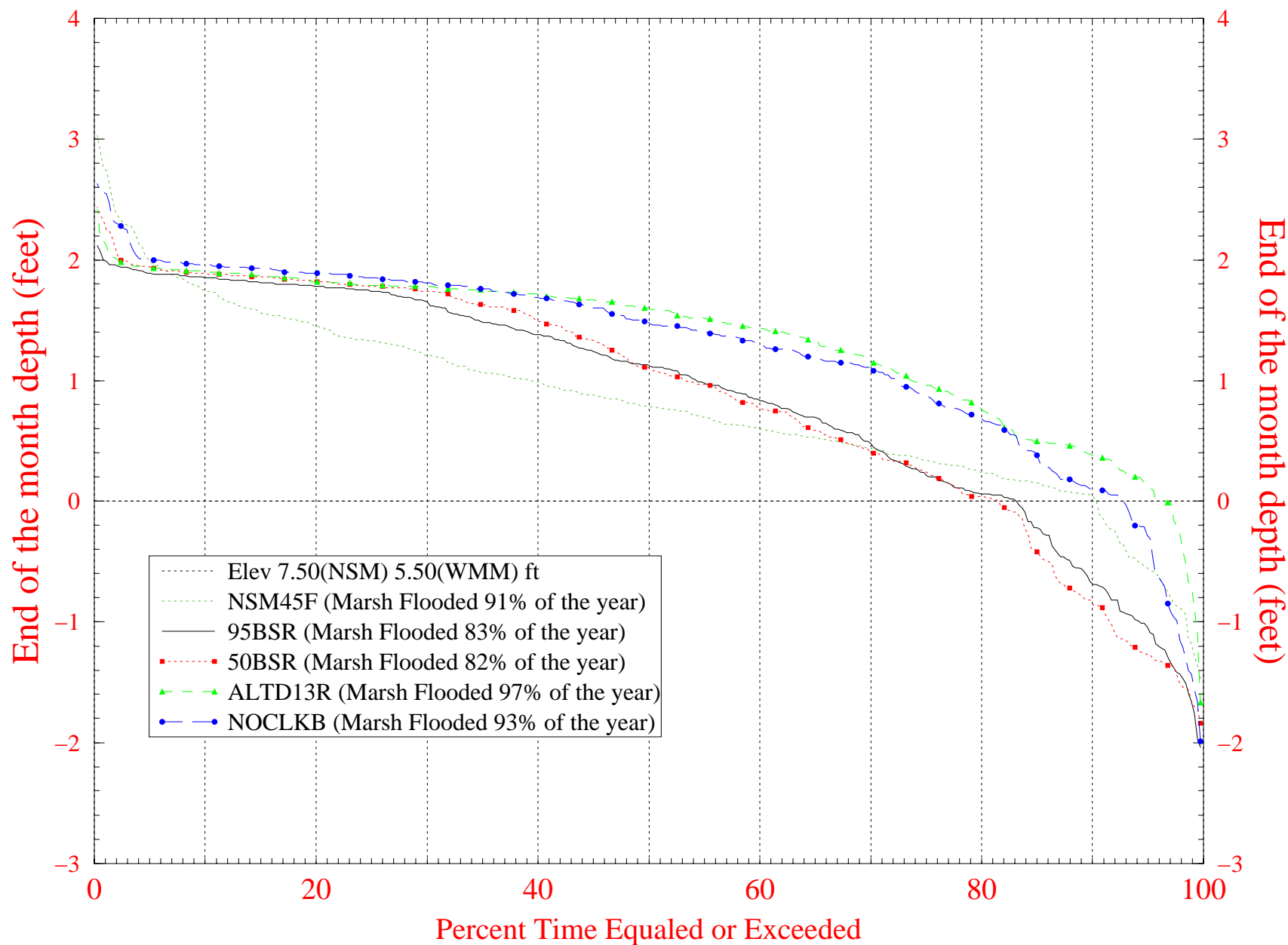


Note: Snake Creek=S29; North Bay=G58+S28+S27; Miami River=S26+S25B+S25; Central=G97+S22+S123; South=S21+S21A+S20F+S20G; Barnes Sound=S197

Targets for Central and South Bay reflect a 30% increase in mean annual dry season flows over the 95 Base
Targets for Snake Creek reflect a minimum monthly flow volume of 13,300 ac-ft (x 5 months for wet season
and x 7 months for dry season) to maintain salinity levels below 20 ppt.

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Fig. 5 Normalized Stage Duration Curves at Cell (R26 C27) Pennsuco Wetlands



Note: Normalized stage is stage referenced to Land Elevation. Thus, values above zero indicates ponding while below zero indicates depth to the water table.

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